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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,585	01/20/2006	Emmanuel Uzoma Okoroafor	M03B120	2673

71134 7590 10/09/2009

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EXAMINER	
WONG, EDNA	
ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
10/09/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/565,585	OKOROAFOR, EMMANUEL UZOMA	
	Examiner	Art Unit	
	EDNA WONG	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 September 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-43* is/are pending in the application.

4a) Of the above claim(s) *5,9,15-23,25 and 27-43* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-8,10-14,24 and 26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *January 20, 2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Election/Restrictions

Applicant's election with traverse of the species of claims **3-4, 8 and 26**, in the reply filed on September 8, 2009 is acknowledged. The traversal is on the ground(s) that independent claim 1 is a generic claim that links all the species together that forms a single general inventive concept. This is not found persuasive because independent claim 1 does not contain a general inventive concept link.

The requirement is still deemed proper and is therefore made FINAL.

Accordingly, claims **5, 9, 15-20 and 25** are withdrawn from consideration as being directed to a non-elected invention.

Claim Rejections - 35 USC § 112

I. Claim **1-4, 6-8, 10-14, 24 and 26** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1

line 5, it is unclear what element is "neobydium". It's not in the Periodic Table of Elements.

Claim 2

lines 1-2, recites "wherein the group of metals *further includes* aluminium".

Claim 1, lines 3-4, recites "is selected from the group of metals *consisting of*".

The scope of group of metals is indefinite because the word "includes" is open and the words "consisting of" is closed (MPEP § 2111.03).

Furthermore, the words "further includes" do not further limit the Markush group designated by the words "consisting of".

II. Claims **13 and 14** are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: between the coating and the metallic layer.

Claim 13

lines 1-2, recite "wherein the coating comprises a thickness less than 100μm".

This claim limitation further limits an element recited in the preamble of Claim 1. Thus, there is no structural relationship between *the coating* recited in the *preamble* of claim 1 and *the metallic layer* recited in the *body* of claim 1.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims **1-4, 6 and 10** are rejected under 35 U.S.C. 102(b) as being anticipated by **WO 02/088593** ('593) and **Moser et al.** (US Patent Application Publication No. 2004/0149759 A1).

Moser et al. is the English equivalent of WO 02/088593.

Moser teaches a method of forming a coating on a plastics substrate comprising the steps of:

applying (= PVD (physical vapor deposition)) a metallic layer **18** (= a diffusion barrier layer)) to the substrate **12** (= a plastic substrate) wherein the metallic layer is selected from the group of metals consisting of magnesium, titanium, tantalum, zirconium, neobydium, hafnium, tin, tungsten, molybdenum, vanadium, antimony, bismuth, and alloys of the aforementioned metals (= an aluminium metal layer); and

subjecting the metallic layer to electrolytic plasma oxidation (= a plasma process, *e.g., RF discharge*) [page 3, [0044]; and Fig. 3b].

The group of metals further includes aluminium (= an aluminium metal layer) [page 3, [0044]].

The metallic layer is deposited on the substrate (= an aluminium layer is applied by PVD (physical vapor deposition)) [page 3, [0044]].

The metallic layer is sprayed on the substrate (= one or more diffusion barrier layers are deposited from the gaseous phase, for example, by plasma spraying) [page 2, [0027]].

The metallic layer comprises a thickness less than 100 μm (page 2, [0021] and [0023]).

The substrate comprises an epoxy-carbon fibre composite or fibre reinforced plastics material (= the stability and bursting pressure of the container can in essence be increased if the *thermoplastic material* of the container wall, for example polyethylene, polypropylene, acetyl butadiene styrene, polyamide, polyvinyl acetate or a polyester, *is reinforced* with a tension-resistant material, preferably with carbon-, glass- or ceramic fibres, but also with steel wires) [page 1, [0016]].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

I. Claims **1-4, 6, 10 and 12-14** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over **WO 02/088593** ('593) and **Moser et al.** (US Patent Application Publication No. 2004/0149759 A1) in view of **Kurze et al.** (US Patent No. 5,811,194).

Moser et al. is the English equivalent of WO 02/088593.

Moser teaches a method of forming a coating on a plastics substrate comprising the steps of:

applying (= PVD (physical vapor deposition)) a metallic layer **18** (= a diffusion barrier layer)) to the substrate **12** (= a plastic substrate) wherein the metallic layer is

selected from the group of metals consisting of magnesium, titanium, tantalum, zirconium, neobydium, hafnium, tin, tungsten, molybdenum, vanadium, antimony, bismuth, and alloys of the aforementioned metals (= an aluminium metal layer); and

subjecting the metallic layer to plasma oxidation (= a plasma process) [page 3, [0044]; and Fig. 3b].

The group of metals further includes aluminium (= an aluminium metal layer) [page 3, [0044]].

The metallic layer is deposited on the substrate (= an aluminium layer is applied by PVD (physical vapor deposition)) [page 3, [0044]].

The metallic layer is sprayed on the substrate (= one or more diffusion barrier layers are deposited from the gaseous phase, for example, by plasma spraying) [page 2, [0027]].

The metallic layer comprises a thickness less than 100 μm (page 2, [0021] and [0023]).

The substrate comprises an epoxy-carbon fibre composite or fibre reinforced plastics material (= the stability and bursting pressure of the container can in essence be increased if the *thermoplastic material* of the container wall, for example polyethylene, polypropylene, acetyl butadiene styrene, polyamide, polyvinyl acetate or a polyester, *is reinforced* with a tension-resistant material, preferably with carbon-, glass- or ceramic fibres, but also with steel wires) [page 1, [0016]].

The method of Moser differs from the instant invention because Moser does not disclose the following:

a. Wherein the plasma oxidation is electrolytic plasma oxidation, as recited in claim ***1***.

b. Wherein the electrolytic plasma oxidation is performed at a pH from 7 to 8.5, as recited in claim ***12***.

Moser teaches that:

> Plasma activation of a plastic substrate is carried out in order to increase adhesion to the subsequent coating. An aluminium metal layer is applied by PVD (physical vapour deposition). The PVD is carried out for example by cathode atomisation (sputtering) and/or internal and external arc vaporisation, external thermal and electron beam vaporisation. *If this metal layer is then oxidised by a plasma process, e.g. by RF discharge, a defined additional Al_2O_3 protective and diffusion barrier layer is formed on the surface*. This is imperative e.g. for a methanol container if no additional protective layer is deposited internally (page 3, [0044]).

Like Moser, ***Kurze*** teaches a method of producing oxide ceramic layers on barrier layer-forming metals or their alloys (col. 1, lines 13-18). *Oxide ceramic layers are produced on aluminum*, magnesium, titanium, tantalum, zirconium, niobium, hafnium, antimony, tungsten, molybdenum, vanadium, bismuth or their alloys *by plasma-chemical anodic oxidation*. The electrolytic bath is adjusted to a pH value of 2 to 8 (col. 2, lines 15-32).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the plasma oxidation described by Moser with wherein the plasma oxidation is electrolytic plasma oxidation; and wherein the electrolytic plasma oxidation is performed at a pH from 7 to 8.5 because plasma-

chemical anodic oxidation would have been a plasma process that would have oxidized an aluminum metal layer to Al_2O_3 as taught by Kurze (col. 2, lines 15-32).

c. Wherein the coating comprises a thickness less than 100 μm, as recited in claim ***13***.

d. Wherein the thickness is less than 50 μm, as recited in claim ***14***.

Kurze teaches plasma-chemically produced oxide ceramic layers having a thickness of 40 to 150 μm (col. 3, lines 33-37).

II. Claim **7** is rejected under 35 U.S.C. 103(a) as being unpatentable over **WO 02/088593** ('593) and **Moser et al.** (US Patent Application Publication No. 2004/0149759 A1) as applied to claims 1-4, 6, 10 and 12-14 above, and further in view of **JP 54-31479** ('479).

Moser is as applied above and incorporated herein.

The method of Moser differs from the instant invention because Moser does not disclose wherein the substrate is roughened prior to applying the metallic layer thereto, recited in claim ***7***.

Moser teaches that:

> The stability and bursting pressure of the container can in essence be increased if the thermoplastic material of the container wall, for example polyethylene, polypropylene, acetyl butadiene styrene, polyamide, polyvinyl acetate or a polyester, is reinforced with a tension-resistant material, preferably with carbon-, glass- or ceramic fibres, but also with steel wires (page 1, [0016]).

JP '479 teaches physically roughening the surface of the plastic structure and spraying molten metal (e.g., Al, Zn, etc.) on the roughened surface of the structure to form a metal coating film (abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the substrate described by Moser with wherein the substrate is roughened prior to applying the metallic layer thereto because roughening the plastic structure would have created anchoring holes to anchor a metal coating film to the plastic structure as taught by JP '479 (abstract).

III. Claim **8** is rejected under 35 U.S.C. 103(a) as being unpatentable over **WO 02/088593** ('593) and **Moser et al.** (US Patent Application Publication No. 2004/0149759 A1) as applied to claims 1-4, 6, 10 and 12-14 above, and further in view of **RU 2,026,890** ('890).

Moser is as applied above and incorporated herein.

The method of Moser differs from the instant invention because Moser does not disclose wherein the metallic layer is formed on a second metallic layer previously applied to the substrate, as recited in claim ***8***.

Moser teaches that:

A container in accordance with the invention, or a film introduced therein, *can also be protected by one or more diffusion barrier layers deposited from the gaseous phase*. Deposition from the gaseous phase is carried out in the known manner with or without chemical reaction in the gaseous phase, or also by co-deposition of materials. Concrete examples of this are: arc vaporisation and cathode atomisation (sputtering). Further examples are: deposition by laser, electron, ion or molecular beams or thermal

action, in each case with or without plasma excitation and with or without magnetic field support, as well as plasma spraying. The deposited layers form a diffusion barrier layer that, where necessary, is also the anticorrosion layer (page 2, [0027]).

RU '890 teaches that wear resistant coatings are obtained by first undercoating an article with a low melting mixture containing (wt%): Cu 1-7, Ni 0.5-1.5, B 0.05-0.1 and balance Zn, and then undercoating with an Al alloy containing, e.g., (wt%): Cu 3.8-4.9, Mg 1.2-1.8, Mn 0.3-0.9 and balance Al. Subsequent micro-arc oxidation to the depth of 2/3 of the thickness of the top layer in the alkaline electrolyte completes the process (abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the metallic layer described by Moser with wherein the metallic layer is formed on a second metallic layer previously applied to the substrate because micro-arc oxidizing an article having first and second metallic undercoatings, where subsequent oxidation to the depth of 2/3 of the thickness of the top layer in the alkaline electrolyte would have produced a wear resistance coating as taught by RU '890 (abstract).

IV. Claim **11** is rejected under 35 U.S.C. 103(a) as being unpatentable over **WO 02/088593** ('593) and **Moser et al.** (US Patent Application Publication No. 2004/0149759 A1) as applied to claims 1-4, 6, 10 and 12-14 above, and further in view of **Wu et al.** ("Effect of Polishing Pretreatment on the Fabrication of Ordered Nanopore Arrays on Aluminum Foil by Anodization", *J. Vac. Sci. Technol.*, Vol. B 20(3), May/June 2002, pp. 776-782).

Moser is as applied above and incorporated herein.

The method of Moser differs from the instant invention because Moser does not disclose wherein the method further includes the step of smoothening the metallic layer prior to the step of subjecting the metallic layer to electrolytic plasma oxidation, as recited in claim ***11***.

Wu teaches that in order to get porous anodic aluminum oxide with perfect hexagonal-packed cells, electropolishing of Al foils has been conducted to obtain a smoother surface before anodization (page 776, "**I.** Introduction").

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method described by Moser with the method further includes the step of smoothening the metallic layer prior to the step of subjecting the metallic layer to electrolytic plasma oxidation because electropolishing the aluminum would have obtained a smoother surface for producing a porous anodic aluminum oxide with perfect hexagonal-packed cells as taught by Wu (page 776, "**I.** Introduction").

V. Claim **24** is rejected under 35 U.S.C. 103(a) as being unpatentable over **WO 02/088593** ('593) and **Moser et al.** (US Patent Application Publication No. 2004/0149759 A1) as applied to claims 1-4, 6, 10 and 12-14 above, and further in view of **WO 02/25113** and **Hasert et al.** (US Patent No. 6,655,937 B2).

Hasert is the English equivalent of WO 02/25113.

Moser is as applied above and incorporated herein.

The method of Moser differs from the instant invention because Moser does not disclose wherein the substrate is a component of a vacuum pump, as recited in claim ***24***.

Hasert teaches that:

The vane **15** has formed-on terminal parts **22** and **23**, *which comprise a high-temperature-resistant thermoplastic such as polyaryletherketone (PEEK), or a material of comparable properties*. This plastic, optionally modified with a specially assembled combination of fillers, has a wear resistance and a low coefficient of friction (col. 2, lines 38-43).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the substrate described by Moser with wherein the substrate is a component of a vacuum pump because terminal parts on a vane for a vane cell vacuum pump would have been comprised of a high-temperature-resistant thermoplastic which are modified with fillers, and have a wear resistance and a low coefficient of friction as taught by Hasert (col. 2, lines 38-43).

VI. Claim **26** is rejected under 35 U.S.C. 103(a) as being unpatentable over **WO 02/088593** ('593) and **Moser et al.** (US Patent Application Publication No. 2004/0149759 A1) as applied to claims 1-4, 6, 10 and 12-14 above, and further in view of **Schoener et al.** (US Patent No. 4,647,347).

Moser is as applied above and incorporated herein.

The method of Moser differs from the instant invention because Moser does not disclose wherein the method further comprises the step of applying to the metallic layer

subjected to electrolytic plasma oxidation a layer formed from at least one metal selected from the group consisting of Mo, Ni, Cr and W, as recited in claim ***26***.

Schoener teaches sealing anodized aluminum and alloys thereof with in a sealant bath comprised of nickel ion (col. 3, lines 1-46).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method described by Moser with wherein the method further comprises the step of applying to the metallic layer subjected to electrolytic plasma oxidation a layer formed from at least one metal selected from the group consisting of Mo, Ni, Cr and W because nickel would have sealed anodized aluminum and alloys thereof as taught by Schoener (col. 3, lines 1-46).

Citations

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Romankiw (US Patent No. 3,971,710) is cited to teach a process for anodizing an article containing a porous oxide-forming metallic layer which is supported by a substrate containing a dielectric (Fig. 5).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDNA WONG whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Edna Wong/
Primary Examiner
Art Unit 1795

EW
October 6, 2009